Revised Biological Assessment for the Ivanpah Solar Electric Generating System (Ivanpah SEGS) Project

Prepared for

Bureau of Land Management

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SECTION 1

Background

Solar Partners I, LLC, Solar Partners II, LLC, and Solar Partners VIII, LLC the individual owners and project proponent of the three separate solar power plants and as tenants in common owners of the "Shared Facilities" required by the three solar power plants propose to develop a solar facility (together referred to as the Ivanpah Solar Electric Generating System, or Ivanpah SEGS) in the Ivanpah Valley about 4.5 miles southwest of Primm, Nevada. These three companies are Delaware limited liability companies. BrightSource Energy Inc. (Applicant or BrightSource), a Delaware corporation, is a technology and development company, and the parent company of the Solar Partners entities.

The Proposed Action is to develop three solar energy plant sites in the Ivanpah Valley located in San Bernardino County, California, 4.5 miles southwest of Primm, Nevada (Figure 1-1, all figures are located at the end of the section). The site is located in Township 17N, Range 14E, and Township 16N, Range 14E on land administered by the Bureau of Land Management (BLM). Access to the site is via the Yates Well Road interchange on I-15 and Colosseum Road. The site is located 0.5 mile to the west of the Primm Valley Golf Club.

BLM's original Biological Assessment (BA) and request for formal consultation was transmitted to the FWS on December 7, 2009. Subsequently, FWS issued its Biological Opinion (BiOp) for the Ivanpah SEGS Project on October 1, 2010 (October 2010 BiOp). The project began construction on October 7, 2010. On February 24, 2011, the BLM requested reinitiation of formal consultation under the Endangered Species Act, pursuant to 50 CFR 402.14, because new information gathered during the clearance of Unit 1 and Common Logistics Area (CLA) and during fencing of Unit 2 and 3 indicated that the effects of the action may affect the tortoise to an extent not previously considered. On March 28, 2011, US Fish and Wildlife Service (FWS) accepted this request. This Revised Biological Assessment has been prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act [ESA] (16 U.S.C. 1536(c)). The Mojave population of the desert tortoise (*Gopherus agassizii*) is a federally threatened species under the ESA. There is no critical habitat within the project area.

FIGURE 1-1
VICINITY MAP
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

CH2MHILL

SECTION 2

Revised Description of Proposed Action

2.1 Introduction

The companies have received Right-of-Way (ROW) grants for use of the land from the Bureau's Needles Field Office and the project is currently under construction. When construction is completed, the Ivanpah SEGS will consist of three independent solar thermal electric generating facilities (or plants) and a Common Logistics Area (CLA) co-located approximately 1.6 miles west of the Ivanpah Dry Lake and 4.5 miles southwest of Primm, Nevada, in San Bernardino County, California (Figure 1-1). The project site is on federal property managed by BLM. The three Ivanpah SEGS facilities (see Figure 2-1) will have a combined net rating of approximately 370 megawatt (MW). The total Ivanpah SEGS project area consists of approximately 3,582 acres. Unit 1 will require approximately 914 acres (1.4 square miles); Unit 2 will require approximately 1,097 acres (1.7 square miles); Unit 3 will require approximately 1,227 acres (1.9 square miles); and the CLA requires approximately 244 acres (0.38 square miles). Linear features of the project (transmission lines, gas line, and roads) affect 100 acres. The developed areas for Unit 1, 2, and 3 will cover a total of 3,237 acres (5.7 square miles).

We do not anticipate any change in the description of the Project Construction Area or the Purpose and Need Statement as referenced in the October 2010 BiOp. However, the Project Description, as related to the translocation sites for desert tortoise, will require modification to reflect the potential for additional individual tortoises requiring translocation. Items 1 and 2 have necessitated revising our Biological Assessment and the previously approved Translocation Plan.

The primary reasons for reinitiating consultation are:

1. The expectation, based on actions undertaken for the Ivanpah SEGS Project to date, that a larger number of desert tortoise will be affected within the site boundaries than originally anticipated in the December 2009 BA and October 2010 BiOp. ;

2. Changes in the desert tortoise translocation strategy and area, which will affect the tortoise in a manner not previously analyzed;

3. Changes to desert tortoise handling procedures which will affect the tortoise in a manner not previously analyzed; and

4. One of the Habitat Enhancement Projects, part of the BLM's required mitigation as identified in the FEIS, has been specified: installing culverts and fencing along Yates Well Road.

An amended Translocation Plan (CH2MHill, 2010) will be provided upon issuance of the reinitiated Biological Opinion.

2.2 Revised Desert Tortoise Density Estimates

2007-2009 Surveys: Desert tortoise density estimates in the October 2010 BiOp were based on protocol-level surveys conducted in 2007, 2008, and 2009. The majority of the site was surveyed in 2007, a strong drought year. A total of 28 live tortoises were found as a result of the combined 2007, 2008, and 2009 protocol-level surveys of the action area: five in Unit 1, one in the CLA, three in Unit 2, six in Unit 3, four in the M3 area, four in the Translocation Area, two near the natural gas distribution line, and three on zone-of influence transects. The 2007 and 2008 surveys were combined and using the FWS calculation detailed as Table 3 in the Field Project Survey Protocols (FWS 2010), a density of 31.7 adults (rounded to 32 adults) for all three units and the CLA was estimated. The 2009 surveys were only conducted in areas associated with the translocation plan, and thus were not used to estimate the number of tortoises within the project area. Locating tortoise during drought years is known to be problematic; there is reduced tortoise activity, tortoises spend more time in their burrows and they tend to be deeper in their burrows, leading to reduced sightability of the species. The 2010 FWS calculation method does include a correction factor for surveys conducted during drought years. However, 2007 was one of the driest years on record and upon review of the clearance data from Unit 1 and the CLA, it became clear that even with the drought correction factor, the number of tortoises on site had been underestimated.

2010 Clearance Surveys Unit 1, CLA: A total of 35 tortoises were cleared from Unit 1 and CLA. On Unit 1, a total of 18 tortoises ≥ 160 mm MCL and 11 tortoises < 160 mm MCL were found, and in the CLA, 2 tortoises ≥ 160 mm MCL and 4 tortoises < 160 mm MCL were found. Clearance surveys and monitoring occurred from October 8, 2010 through April 15, 2011.

Table 2.1: Number of tortoises cleared from Unit 1 and CLA and calculated densities.

Location	Area (sq mile)	Number of Tortoises		Ratio of Big to small tortoises	Density of Tortoises (per sq mile)	
		≥ 160 mm	<160 mm		≥ 160 mm	< 160 mm
Unit 1	1.43	18	11	3:2	12.67	8.45
CLA	0.38	2	4	1:2	5.26	10.52
Both Unit 1 and CLA	1.81	20	15	4:3	11.05	8.29

Estimating Number of ≥160 mm tortoises within the project work area:

We estimated the number of tortoises ≥160 mm MCL using two different methods. The first method used the densities of ≥160 mm MCL tortoises cleared from within Unit 1 and CLA and applied this density across Units 2 and 3. This method does not allow us to determine confidence intervals for our estimate. The second method used the 2010 FWS pre-construction survey protocol, which does determine confidence intervals.

Method 1 --Extrapolating Unit 1 and CLA density: Using clearance survey information, we calculated the density of tortoises removed from these areas (Table 2.1). From the calculated density of tortoises, we multiplied the combined Unit 1 and CLA density by the acreages for Units 2 and 3, to estimate the numbers of tortoises that could be within these units (Table 2.2).

Table 2.2: Extrapolating Unit 1 and CLA combined density across Units 2 and 3 as a means of estimating potential number of tortoises likely to be within these areas.

Location	Area	Calculated Density from Table 2.1	Estimated Number of Adults
Unit 2	1.7 miles	11.05	18.8
Unit 3	1.9 miles	11.05	21
Total Project Area*	5.7 miles		60

*Unit 1 and CLA cleared animals plus estimates from Units 2 and 3 (portions of tortoise rounded up)

Because of the differences in habitat condition (e.g. soil type, presence/absence of caliche caves, location on the bajada, etc.) between the units, we would consider this estimation method likely to underestimate the number of tortoises. Because there is a statistically robust method for estimating numbers of tortoises ≥160 mm MCL, we will not be using this method for our means of determining effects of the project. We provide it to allow for a comparison to the estimation for tortoises <160 mm MCL (see below).

Method 2 -- 2011 Surveys, Unit 2 and 3*:* FWS (2010) protocol-level surveys were conducted in Unit 2 and 3 between April 15-17, 2011. This protocol is only valid for estimating tortoise ≥160 mm MCL. The total number of tortoises ≥160 mm MCL in this estimate is 16 for ISEGS 2 and 49.5 for ISEGS 3 (Table 2-3). Because this method is statistically robust, we will use this in the formulation of our effects analysis.

Table 2-3: Desert Tortoise Density Estimates for tortoises ≥160 mm MCL on ISEGS Units 2 and 3

	Tortoise Observed	Estimated Number of Tortoise	Lower 95% CI	Upper 95% CI	Acreage
Unit 2	8	16.0	6.47	39.62	1097
Unit 3	25	49.5	24.00	101.90	1227
TOTAL	33	65.5	30.47	141.52	2324

Estimating Number of <160 mm tortoises within the project work area:

The cryptic nature of small tortoises makes them difficult to find. Consequently, the FWS protocol-level survey can only accurately estimate density for tortoises ≥160 mm MCL. Estimating number of tortoises <160 mm MCL that will be within the project work area is difficult. We estimated number of <160 mm MCL using three methods, described below.

Method 1--Extrapolating Unit 1 and CLA density: Using the clearance survey information from Unit 1 and CLA, we calculated the density of tortoises for Unit 1 and CLA (Table 2.1). From the calculated density of tortoises <160 mm MCL, we multiplied the combined Unit 1 and CLA's density by the acreages for Units 2 and 3, to estimate the numbers of tortoises < 160 mm MCL that could be within these units (Table 2.4).

Table 2.4: Extrapolating Unit 1 and CLA combined density for tortoises <160 mm MCL/sq mile across Units 2 and 3 as a means of estimating potential number of tortoises likely to be within these areas.

Location	Area	Calculated Density from Table 2.2	Estimated Numbers of Tortoises <160 mm MCL
Unit 2	1.7 sq miles	8.29	14.1
Unit 3	1.9 sq miles	8.29	15.8
Total Project Area*	5.7 sq miles		45

*(Unit 1 and CLA cleared animals plus estimates from Units 2 and 3) rounded up

We believe this method underestimates the number of tortoises <160 mm MCL that occur within the project work area. Unit 1 and CLA are lower in the valley and overall have fewer tortoises than Unit 3 does. We provide this information for its comparative value. In addition, it assumes that the clearance of Phase 1 and the CLA discovered all desert tortoises that were smaller than 160mm in size. In reality, the clearance surveys likely missed many desert tortoises in these smaller size classes, providing another source of error that would contribute to the underestimation of population size with this method. Finally, the use of this method assumes the the results of the fall 2010 surveys would be representative of the demography of the population during all times of the year. However, a similar survey performed in the early fall may have found a higher proportion of newly hatched individuals from clutches laid in the summer. Because the fall 2010 surveys were not performed until late-October and early-November, it is likely that a large number of the juveniles from summer 2010 clutches would have died due to natural sources of mortality prior to the surveys. This again provides another source for inaccuracy as the population estimates using this method look at only a single point during the year and do not take into account the dynamic fluctuations in juvenile numbers over the course of a year.

Method 2--Extrapolating Unit1 and CLA density ratio: Using the clearance survey information, we calculated the density of tortoises removed from these areas and the ratio of ≥160 mm (large) tortoise to <160 mm (small) tortoises.(Table 2.1). Applying the 4:3 ratio determined for Unit 1 and CLA combined to the 2010 FWS protocol estimate of numbers of ≥160 mm MCL tortoises for Units 2 and 3, we estimate that Unit 2 could have 12 tortoises <160 mm MCL and Unit 3 could have 37 tortoise <160 mm MCL. The same caveats identified above would apply to this method as well. This method assumes that the clearance of Phase 1 and the CLA discovered all desert tortoises that were smaller than 160mm in size. In reality, the clearance surveys likely missed many desert tortoises in these smaller size classes, providing another source of error that would contribute to the underestimation of population size with this method. Finally, the use of this method assumes the results of the fall 2010 surveys would be representative of the demography of the population during all times of the year. However, a similar survey performed in the early fall may have found a higher proportion of newly hatched individuals from clutches laid in the summer. Because the fall 2010 surveys were not performed until late-October and early-November, it is likely that a large number of the juveniles from summer 2010 clutches would have died due to natural sources of mortality prior to the surveys. This again provides another source for inaccuracy as the population estimates using this method look at only a single point during the year and do not take into account the dynamic fluctuations in juvenile numbers over the course of a year.

Table 2.5: Applying the calculated ratio of large:small* tortoises from Unit 1 and CLA to the estimated number of large* tortoises for Units 2 and 3 as a means of estimating potential number of small* tortoises likely to be within these areas.

Location	Estimated Number of Large* tortoises from Table 2.3	Ratio of Large to Small* Tortoises from Table 2.1	Estimated Numbers of Tortoises <160 mm MCL
Unit 2	16	4:3	12
Unit 3	49.5	4:3	37
Total Project **			64

*Large means ≥160 mm MCL, small means <160 mm MCL

**Unit 1 and CLA actual animals plus the estimates from Unit 2 and 3

Method 3--Average Female Reproductive Output: As of April 18, 2011, seven adult female tortoises are in the quarantine pens from Unit 1 and CLA. In Unit 2, four adult females have been observed during survey efforts. In Unit 3, thirteen adult females have been observed during surveys. Therefore there are a minimum of 24 female tortoises located in the construction area. Bear in mind that the numbers for Unit 2 and 3 will likely increase during clearance surveys when multiple passes are walked. We expect the male:female ratio will be 1:1. Therefore, of the estimated number of large tortoises on Unit 2 (16 individuals), applying the 1:1 sex ratio, we would predict that 8 of them are female. In Unit 3, we estimated 50 large tortoises, thus assuming a 1:1 sex ratio, we would predict that 25 of them are female. Therefore we will use an estimate of 40 females live within the project work area. Tortoises that are <160 mm MCL would have hatched within the last 15 years (Germano 1992). Thus, we can estimate the number of animals within this size class by estimating reproductive output during this time.

Since 2008, average or above-average rainfall has occurred in the Mojave Desert. Fort Irwin reproduction data since 2008 has shown that approximately 90 percent of all females laid one clutch with a mean of 4.5 eggs/clutch, and approximately 50 percent of all females laid a second clutch with a mean of 3.7 eggs (Walde pers. comm.). Therefore, we used the follow equation to estimate reproductive output in an average or better rain year:

adult females * 0.9 * 4.5 eggs + # adult females * 0.5 * 3.7 eggs = # eggs laid that year

Our estimated reproductive output for our estimated 40 adult female tortoises on the ISEGS construction site is 236 eggs per good rain year. Therefore, we estimate that during the last 15 years, 3540 number of eggs could have been laid within the project. We recognize that not all of the last 15 years have been good rain years and that during bad rain years, reproductive output can fall to essentially nothing. Using the assumption of all good reproductive years provides an overestimate of juveniles on site. We do not feel that we can make a reasoned argument as to what reproductive output would have been in bad rain years. Using the data we can reasonably estimate (40 adult females and reproductive output during a good rain year) is our best course.

Table 2.3: Assumed hypothetical life table (survival rates) for tortoises ages 0 to 15 years that meets the estimated survival rate of 2% of hatchlings surviving from hatching to being sub-adults.

Year	Number of Juveniles	Survival Rate
0	100*	0.5
1	50	0.6
2	30	0.6
3	18	0.7
4	12.6	0.7
5	8.8	0.8
6	7	0.8
7	5.6	0.8
8	4.5	0.9
9	4.1	0.9
10	3.7	0.9
11	3.3	0.9
12	3	0.9
13	2.7	0.9
14	2.4	0.9
15	2.2	0.9

There is a high natural mortality rate for juvenile tortoises. Annual survival rates have been documented at 85.5 % (Germano and Joyner 1988) and 88% (Bjurlin and Bissonette 2004). Bjurlin and Bissonette (2004) noted that the rate of survivorship from egg to hatchling to first brumation was 40%. There is a general agreement that between hatching and recruitment, the total mortality rate is estimated at 95-98% (e.g. Germano 1994). However, there is no published life table for desert tortoise. We created the following life table estimating reasonable annual survival rates over a given 15 year period that results in an overall 2% survival for this period. Using an estimated number of 236 eggs produced in a good year and the assumed mortality/survival rates from our hypothesized life table, we estimate that 608 juveniles (tortoises <160 mm MCL) would be within the project work area.

Given the uncertainty of reproductive output during poor rain years and the actual number of females on site and annual mortality rates of juveniles, we believe that 608 juveniles is a reasonable conservative (e.g. assuming a larger impact than is likely) estimate. Based on number of adult females (7 known from Unit 1 and CLA, 8 estimated from Unit 2, and 25 estimated from Unit 3), a reasonable estimate of tortoises < 160 mm MCL by Unit would be 106 for Unit 1, 122 for Unit 2, and 380 for Unit 3.

<u>Estimated Tortoise Density outside the project work area:</u>

FWS protocol-level desert tortoise surveys commenced April 11, 2011 and will cover the entire translocation area to determine tortoise abundance and estimate density. It is anticipated these surveys will be completed on or about April 25, and results provided to regulatory agencies April 30, 2011.

As of April 24, 2011 there were 33 tortoises ≥160 mm MCL, have been observed in the protocol surveys outside the project work area. Area surveyed to date covers 19.5 sq km of the total 43 sq km needing to be surveyed. Surveys of this area are expected to be complete by the end of April, with the calculations completed in early May. BLM will provide this data as it becomes available.

In the mean time, to estimate the number of tortoise that could be within the 43 sq km that surround the project site, we will apply the Line Distance Sampling density for Ivanpah Valley, which is 16.84 tortoise ≥160 mm/sq mile (6.28/sq km). Therefore, we anticipate a minimum of 270 tortoises ≥160 mm to be in the vicinity of the project work area. Using method 3 from above to estimate the number of juvenile tortoises within the vicinity of the project, we estimate that one half of the 270 tortoises are females. These 135 females could produce 797 eggs in a good rain year. When 797 eggs laid each year is incorporated into our hypothetical life table, we estimate 2055 juveniles are likely to occur within the 2 km buffer around the project fence line.

2.3 Revised Translocation Strategy and Area

The current anticipated number of tortoises ≥160 mm MCL within the project site is estimated at 86 individuals but could be as high as 162 individuals. The original translocation plan could accommodate 38 tortoises >180 mm MCL, and thus a new translocation strategy has been developed. The goals for translocation strategy are to reduce the impact of the taking and maximize potential for recovery. This strategy has 3 component parts: 1) within home range translocation; 2) outside home range translocation; and 3)improve juvenile survival.

<u>Within Home Range Translocation</u>: BLM proposes to move tortoises ≥120 mm MCL found within 500 meters of an external fence over that fence except along the eastern boundary of Unit 2 and 3. This approach would be more likely to relocate individuals within a portion of their existing home range and facilitate more natural movement behaviors. These individuals would be translocated in a similar spatial distribution as found on the site (i.e., approximately 500 meters from the place of capture). Thus, a tortoise found 50 meters from the fence would be moved 450 meters perpendicularly from the fence; whereas, a tortoise located 450 meters from the fence would be moved 50 meters perpendicularly from the fence).

Based on translocation studies conducted at Fort Irwin National Training Center, tortoises moved one kilometer or less traveled much shorter distances than animals translocated more than one kilometer (Walde, pers. comm.). By year two, translocation distances traveled by tortoises moved less than one kilometer from the point of capture were comparable to the resident and control groups (Walde, pers. comm.). Hence, it was concluded that tortoises that are translocated to an area near or within their home range may habituate more quickly than those moved many kilometers from their original home range. Additionally, tortoises translocated short distance may be less likely to come into contact with new, unknown resident tortoises, potentially minimizing disease transmission.

Outside Home Range Translocation: Tortoises ≥120 mm MCL found further than 500 meters from an external fence will be translocated to an area adjacent to I-15 (Figure 2-2). Areas adjacent to primary roadways (from 0 to 1600 m from edge of road) have been shown to have reduced tortoise densities (e.g. Nicholson 1978). The lack of tortoise is presumably resulted from increased mortality from vehicle strikes (e.g. Boarman and Sazaki 2006). Interstate 15 will be fenced to prevent tortoises from accessing the roadway. Moving tortoises into this depaurate zone should result in reestablishing tortoise into this currently unoccupied area. Had all tortoises from the project site been moved to areas immediately adjacent to the project fenceline, there could have been an increase in disease vectoring related to the increased tortoise density. By moving some tortoises to the depapurate zone, we will not dramatically increase the tortoise density immediately adjacent to the project site, presumably reducing the potential for disease vectoring.

Because tortoises have been shown to travel more post translocation, if they are translocated more than 1 kilometer (Walde, pers. Comm.), temporary fencing will be placed around the other 3 sides of this area to keep tortoises in this zone until they have settled into their new home range. The two culverts that go under I-15 will be temporarily fenced with tortoise proof fencing for the duration of the monitoring or until the south side of I-15 is fenced with tortoise-proof fencing. At least one of these culverts will likely be within the boundaries of the enclosure. Temporary fencing is expected to be in place for 10 years.

There is concern that the lack of tortoises in this near roadway zone may not be caused by increased road mortality, but instead are related to other environmental factors. In particular, concerns have been raised regarding toxicants from vehicles or road maintenance activities, road noise, and road vibrations. To address these concerns, additionally studies will be conducted that will measure these variables and health of tortoises placed in this translocation area. Toxin levels in soils, plants, and air will be evaluated and blood chemistry panels will be processed on tortoises in this area for comparison with samples collected within other portions of the translocation and control areas. The specifics of these studies will be developed in conjunction with FWS and will be in place prior to animals being translocated into this area.

Improved Juvenile Survival: It is know that juvenile tortoises have a high mortality rate. In an attempt to reduce this naturally high mortality rate, all tortoises <120 mm MCL found within the project work area would be moved to and kept in holding pens until they are >120 mm MCL. All tortoises < 120 mm MCL, including those that are born in the holding pens spring 2011 or 2012, will be held in captivity for a maximum of 5 years or until they reach 120 mm, whichever comes first. When a cohort of at least 30 tortoises reaches 120 mm, they will be released as a group in the next translocation window (spring or fall).

While in captivity, vegetation would be monitored to ensure sufficient forage was available. If natural forage was not sufficient, supplemental forage would be provided. If the natural rain was below average, then supplemental watering would be done in the pens, e.g. 0.5 inch of water 2 to 3 times to replicate or supplement normal winter or summer monsoon rainfall patterns. No juvenile tortoises will be translocated during a drought year.

If the monitoring studies discussed above associated with the I-15 translocation area indicate that contaminants, noise and vibration do not seem to be an issue, these juvenile tortoises, the 120mm cohorts described above, would then be moved to the I-15 zone to create a more natural demographic (improve age-class/size-class representation in this newly established population). If the monitoring indicates that the devoid/depleted zone is related to contaminants/noise/ vibration instead of just road mortality, then a more appropriate translocation area for these individuals would be determined at that time. These individuals would be radio transmittered and followed for at least 5 years to determine survival and how successful they are assimilating into the existing population. A detailed Juvenile Survival Program, a chapter in the translocation plan.

Translocation Area:

Based on the translocation methodology identified above, the BLM proposes that the new translocation area be defined as a 2-kilometer area surrounding the entire Ivanpah SEGS site, excluding the area east of Unit 2 and 3 (Figure 2-2). The area to the east of Unit 2 and 3 is currently under a right of way grant application (First Solar, Stateline CACA-48669). Unless this grant application is officially denied or the applicant withdraws it, no tortoises would be translocated into this area. Excluding the area east of Unit 2 and 3 is to prevent the need to move individuals translocated off ISEGS a second time should the application be granted. If at some point in the future, this area were no longer under a right of way application, the BLM would reconsider this area for potential translocation activity. The proposed translocation area would continue from the southern end of Unit 1 to I-15 and from Yates Well Road to Nipton Road (Figure 2-2).

Proposed Conservation and Minimization Measures for Translocation Program:

1.Required standards identified the 2010 Guidelines for Translocation and Health Assessment will be used. When guidelines are updated, the most recent version will be incorporated.

2. No tortoises of any size will be translocated into the wild during drought years. If tortoises need to be moved off the project site and it is a drought year, tortoises would be moved into the holding pens in the CLA. Tortoise will be held in these pens until the next ≥ average rain year.

3. For translocation into the wild, during years of adequate precipitation and forage, BLM will authorize translocation between March 25 – April 15, or October 1 – October 5. The reason for these date restrictions is decrease the risk of mortality for translocated tortoises. Date restrictions are necessary because adequate forage is typically diminishing in the spring after April 15th and

extreme temperatures are more likely during the latter part of May and latter October. Because of the increased movement after translocation, the tortoises translocated at a later date would be exposed to a more hostile environment. Their unfamiliarity with resource locations increases their distances moved and thereby increases their vulnerability. Translocation in the early spring and/or early fall would allow translocated tortoises time to explore their new territories and locate resources.

4. No translocations into the wild, including both inside and outside home range translocations as described above, will take place until Interstate 15 is fenced.

5. The single exception to measure number 4 above, are for tortoises in “fence line distress”. A tortoise in fence line distress is defined for the purposes of this BA as a tortoise ≥120mm inside of a fenced work area observed to be persistently pacing a fence line. If a tortoise is in fence line distress, it can be translocated immediately without I-15 being fenced, following the rule set in the “Within Home Range Translocation” section above.

Effectiveness Monitoring:

The Effectiveness Monitoring Program will be implemented as required by FWS during which time all radio-telemetered tortoises will be tracked at Program-stated intervals and habitat variables affecting their survival will be measured. This data collection will be ongoing minimization and will commence after the beginning of translocation. The EMP will investigate the ensemble drivers of desert tortoise survival in space and time. Specifically, it will investigate the interdependent roles of tortoise movement patterns, habitat use, health status, including *Mycoplasma agassizzii* and other pathogens, toxicant levels, effects of I-15 road noise and vibration, and physical features (e.g., habitat structure, composition, and fragmentation, soil properties) and processes (e.g., precipitation and temperature gradients) across a focal study landscape (i.e., Ivanpah Valley), all of which combine to shape desert tortoise survival. It is hypothesized that survival of this species is determined by a combination of short-term processes, such as epizootics occurring over a period of 1 to 3 years (Jacobson et al. 2006; Berry 1997), and longer-term processes, such as shifts in climatic regimes (e.g., drought cycles) and habitat quality occurring over decades (Hereford et al. 2006).

For the proposed program, three ‘study groups’ will be established—translocated, recipient, and control—which will be subject to data collection efforts that seek to identify critical determinants of tortoise survival. This approach will allow the effect of translocation to be isolated from other potential drivers of survival, such as differences in anthropogenic impacts, habitat quality, weather and climate, disease status, and interactions with conspecifics among the three study groups. The EMP is considered a chapter of the translocation plan.

Control and Resident Population Surveys and Monitoring:

Transects spaced at 10-meter intervals will be used to survey the translocation area (as identified in Figure 2-2) as described by FWS desert tortoise survey protocol (2010) or most recent. One pass shall be walked. All tortoises encountered will be processed, transmittered, health assessments conducted (between May 15 and October 31), and released. Tortoises will be transmittered until an equivalent number of non-adult (<160 mm MCL) and sub adult/adult (≥160 mm MCL), male and female tortoises are located to replicate the number of translocated tortoises. Tortoises within this area are considered part of the Resident Population.

The proposed control area would be located south and east of the project area. It is bound by Nipton Road to the south, McCullough Mountains to the east, Interstate 15 (I-15) to the west, and Primm, NV to the north (Figure 2-3). Because Nipton Road is not currently scheduled to have tortoise-proof fencing installed, the perimeter of the proposed control area would be setback 500 meters from this thoroughfare. Transects spaced at 10-meter intervals will be used to survey the control area (as identified in Figure 2-3) as described by FWS desert tortoise survey protocol (2010) or most recent. One pass shall be walked. All tortoises encountered will be processed, transmittered, health assessments conducted (between May 15 and October 31), and released. Tortoises will be transmittered until an equivalent number of non-adult (<160 mm MCL) and sub adult/adult (≥160 mm MCL), male and female tortoises are located to replicate the number of translocated tortoises. Tortoises within this area are considered part of the Control Population.

Movements, home ranges, habitat characteristics, disease prevalence, and survival of the resident and control populations will be compared to the same information collected on the translocated tortoises. These animals will be studied for at least 5 years. A detailed plan of this study will be provided as a chapter of the translocation plan.

2.4 Vegetation Survey

The survival and ecological requisites of the desert tortoise may be tightly coupled with a wide range of habitat variables such as: plant cover and diversity, substrate size and type, prevalence of washes, presence of calcium carbonate development, rainfall patterns, etc. Before the loss of more habitat in Unit 1 and with the onset of spring, BrightSource conducted a vegetation and substrate assessment in all Ivanpah units, the translocation area, and the control area.

A line-intercept approach was used to measure and quantify key vegetation attributes, including the cover, height, composition, and spatial patterning of perennial shrub vegetation across the study area. To assess annual vegetation, annual cover and composition of herbaceous plants will be measured and estimated.

2.4.1 Vegetation Survey Protocol

Shrubs and succulent plants were surveyed along two, 100-meter transect lines intersected perpendicularly and oriented in the four cardinal directions (Canfield 1949). All perennial plants intersecting the lines were measured for height, abundance, composition, diversity, and richness. Annual plants were sampled for abundance, composition diversity, and richness using a 20 × 50 cm Daubenmire plot placed every 10 meters along each transect line (Daubenmire 1959). Soil type and substrate class were described at each corner of the Daubenmire plots according to a soil texture triangle (Thien 1979). Data were collected in Unit 2 and 3, throughout the proposed translocation area, and the proposed control area. Between March 29 and April 13, 2011, 44 transects were conducted in the three Ivanpah units, 233 transects in the translocation area, and 139 transects in the control area.

2.4.2 Data Analysis

Methods for the analysis of the vegetation and substrate data set will be provided with the results. All vegetation data are being analyzed and will be available for review by early May 2011.

Species diversity will be calculated from Simpson's Index of Diversity (Smith 1992), using the following formula:

$$Diversity = 1 - \frac{\sum n(n-1)}{N(N-1)}$$

Where,

N = Total number of individual plants
n = Number of individuals of a particular species

Species richness is the total number of unique species at each site sampled.

Tortoise habitat quality in the proposed translocation and control areas will be evaluated according to: a) similar vegetation characteristics to Unit 1, 2, and 3; b) wash density; and c) abundance and distribution of known tortoises and their associated sign. Wash density is derived from a digital elevation model and calculated within ArcGIS 9.2 (ESRI, Redlands, CA, USA). Because tortoises are known to use wash habitat in greater proportion to its availability (Jennings et al. 1997), high wash density is considered to increase habitat suitability for tortoises.

2.5 Proposed Changes to Handling Procedures

Use of Quarantine Pens and Health Assessments

Desert tortoises ≥120 mm MCL, found on the project site more than 500 meters from the fence line, or within 500 meters of the eastern fence line of Unit 2 and 3 will initially be transferred to a quarantine pen and await translocation. All tortoises < 120 mm MCL would be transferred to the ISEGS quarantine pens regardless of their capture location within the construction site, as described in section 2.3 Improved Juvenile Survival. Health assessments will be conducted as tortoises are captured during spring surveys. Health assessments, blood, nasal lavage, and oral swab samples will be collected as soon as possible (i.e., between May 15 and October 31, or according to the most current FWS protocol). Any tortoise observed on Ivanpah SEGS with clinical signs of Upper Respiratory Tract Disease (URTD) or appearing severely debilitated would be immediately moved into a quarantine pen.

Special Procedures for Females and Hatchling Tortoises

Spring 2011 and potentially spring 2012 calls for special procedures as female tortoises may be in the quarantine pens during nesting activities. The following subsections provide a plan for the disposition of the hatchling tortoises, Reproduction Plan for the Ivanpah SEGS Project (Reproduction Plan). We will use these tortoises for an onsite Juvenile Survival Program that will be developed in consultation with the FWS, California Department of Fish and Game, BLM, California Energy Commission (CEC) and other applicable regulatory agencies. Our goal is to capture this reproductive output.

This Reproduction Plan states that a Juvenile Survival Program will be developed to accommodate the translocation of juvenile tortoises, <120 mm MCL, found during clearance surveys as well as those that hatch from eggs laid in the quarantine pens by adult females currently being held, and those juveniles that may be placed in the pens during spring 2011 and 2012. In addition, any eggs located during clearance surveys would be relocated to the quarantine pens. Upon release at >120 mm MCL, these tortoises would then become part of the translocated group and tracking and data collection on this cohort will become part of the minimization effort for monitoring long-term survival of the translocation effort.

Radiography of Females

In a year with good forage available (like spring 2011) the number of eggs likely to be produced is substantial. The purpose for x-raying female tortoises is to capture their reproductive effort that would be lost if they were allowed to roam within the fenced work area and lay their eggs. If allowed to roam, it is not likely that the eggs would be discovered during tortoise clearance surveys, and they would either be crushed by construction equipment or the neonates would be depredated.

Therefore, the plan is to capture the female tortoises in Unit 2 and 3 and put them in pens. Through the use of x-rays, the biologists would know when eggs were shelled and how many eggs would be laid. Each female will be radiographed at 10- to 14-day intervals beginning about April 15 and ending when no female has eggs, for a minimum of 20 days after June 1. Females may lay up to three clutches, thus the earliest any female would not be x-rayed would be June 20. When a female has shelled eggs her pen will be visited at least every 1 to 1.5 hours so that when she lays the location of the nest site can be identified.

Even in the pens, neonate tortoises are difficult to find. Hatchling tortoises can fit through the mesh and can escape the pens if all of them are not found soon after hatching. If nest sites are identified, they can be caged and the hatchlings removed to special neonate pens with minimal chance of losing nests or hatchlings.

At the end of the nesting season the females would be returned to the place of capture to await translocation, or placed in an adult pen if construction is proceeding in her point of capture. This process will prevent both loss of this year's offspring as well as decrease the chances of not locating these hatchlings while monitoring mowing and mulching operations. This, in turn, decreases mortality thereby further minimizes the impact of the taking and decreases the chance of reaching the mortality take limit for the project.

The radiography machine proposed for use will be the same as the one currently permitted for use at Fort Irwin, California.

Eggs

BLM's proposal is to leave the eggs to incubate and hatch *in situ*. Gravid females would be placed into a specialized hatchling pen for the remainder of the nesting season. Upon conclusion of the nesting season the females would be returned to the place of capture to await translocation, or placed in an adult pen if construction is proceeding in her point of capture. If clearance surveys are not to be conducted in Unit 2 or 3 until fall 2011 or spring 2012 the females will be returned to their point of capture at the end of the nesting season, but if clearance surveys are conducted in that Ivanpah unit the female would remain in an adult pen.

The specialized hatchling pens will be 10 meters square and covered with mesh netting. Care for the Juvenile Survival Program tortoises will be as stipulated in the revised Husbandry Plan, a chapter in the Translocation Plan.

Incubation is approximately 90 days in length. A cover of netting will be placed over each juvenile pen to protect against avian predators. Upon emergence, the neonates would be incorporated into the Juvenile Survival Program, a subset of the translocation plan, as explained above.

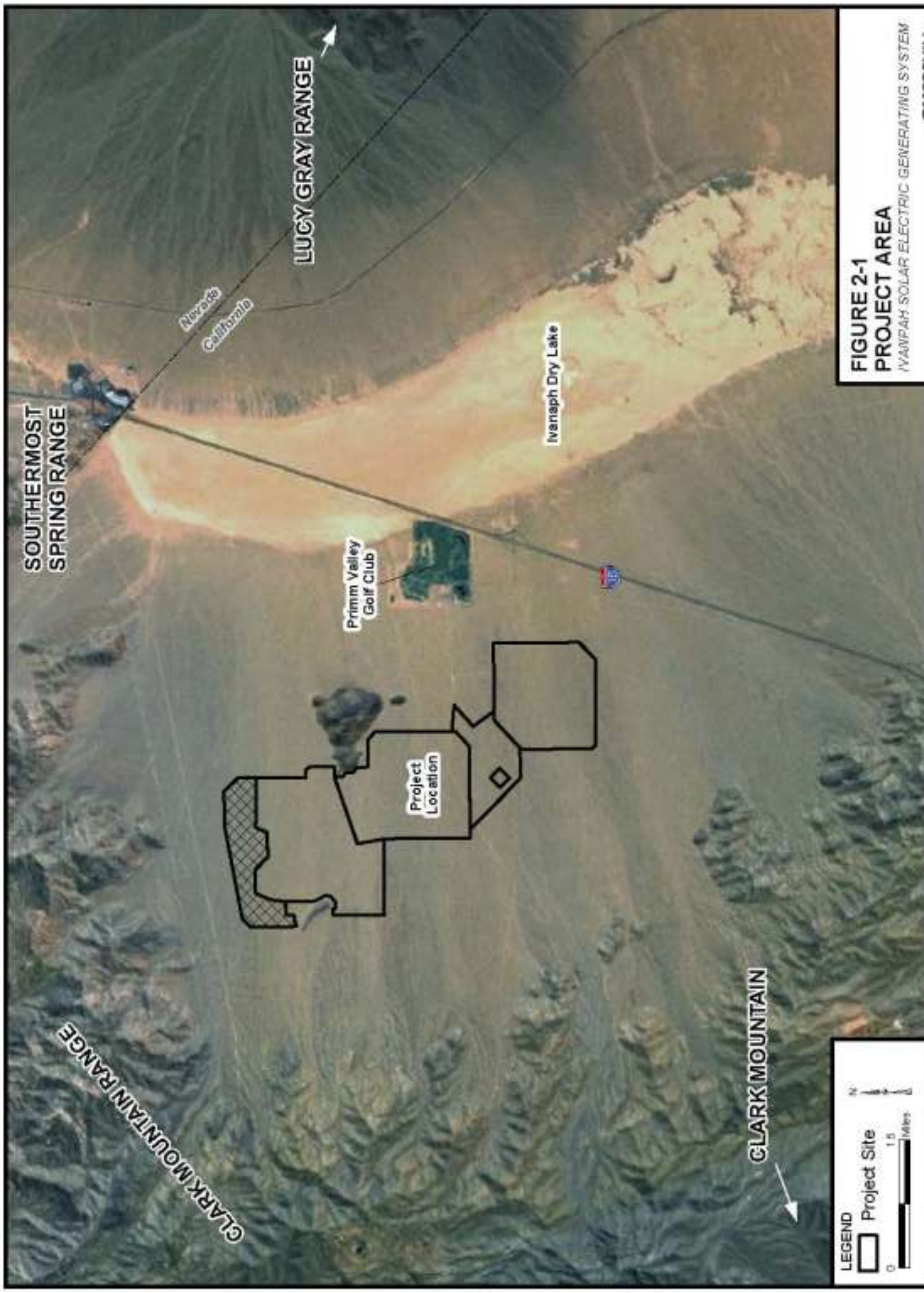

FIGURE 2-1
PROJECT AREA
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

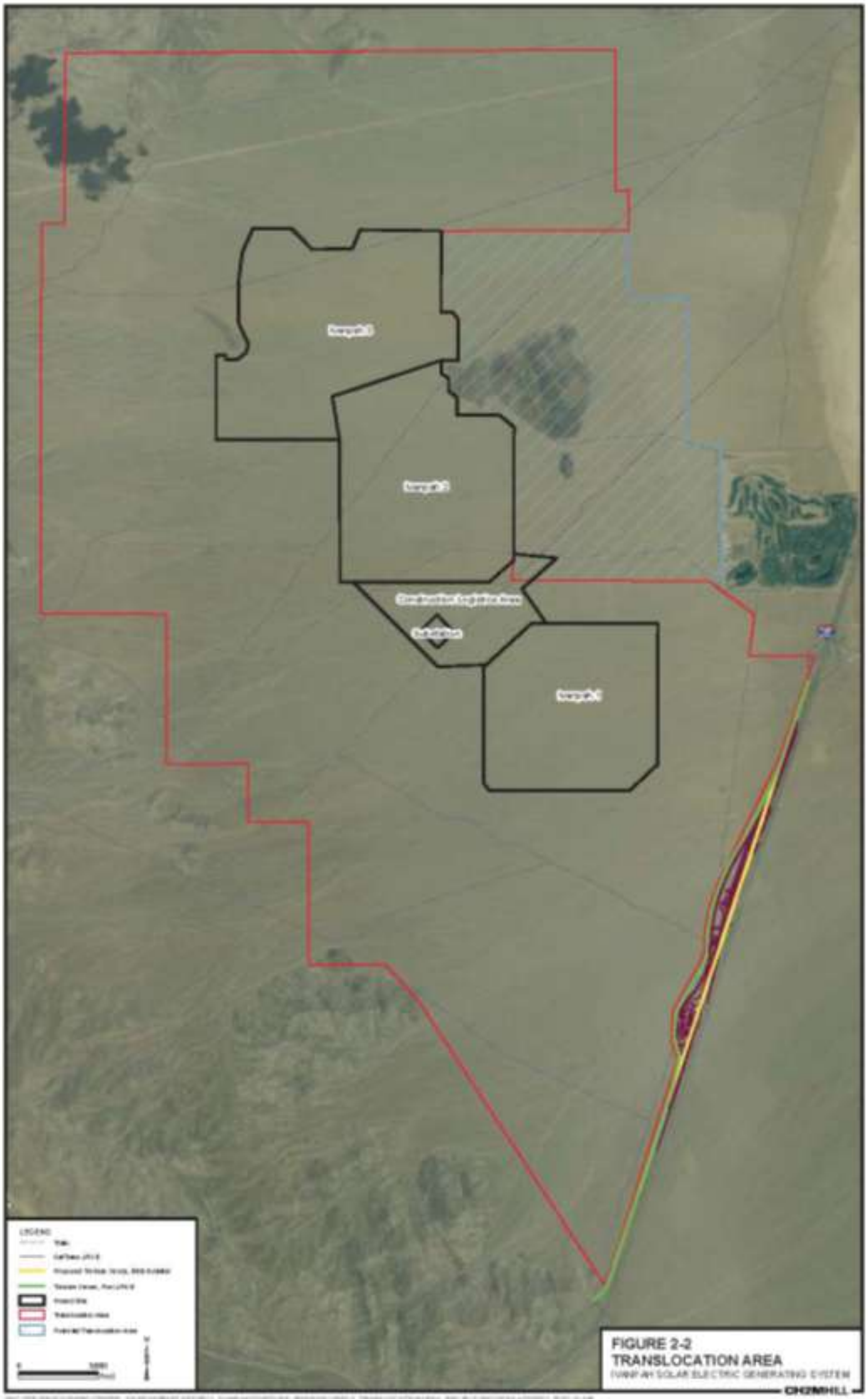

FIGURE 2-2
TRANSLOCATION AREA
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

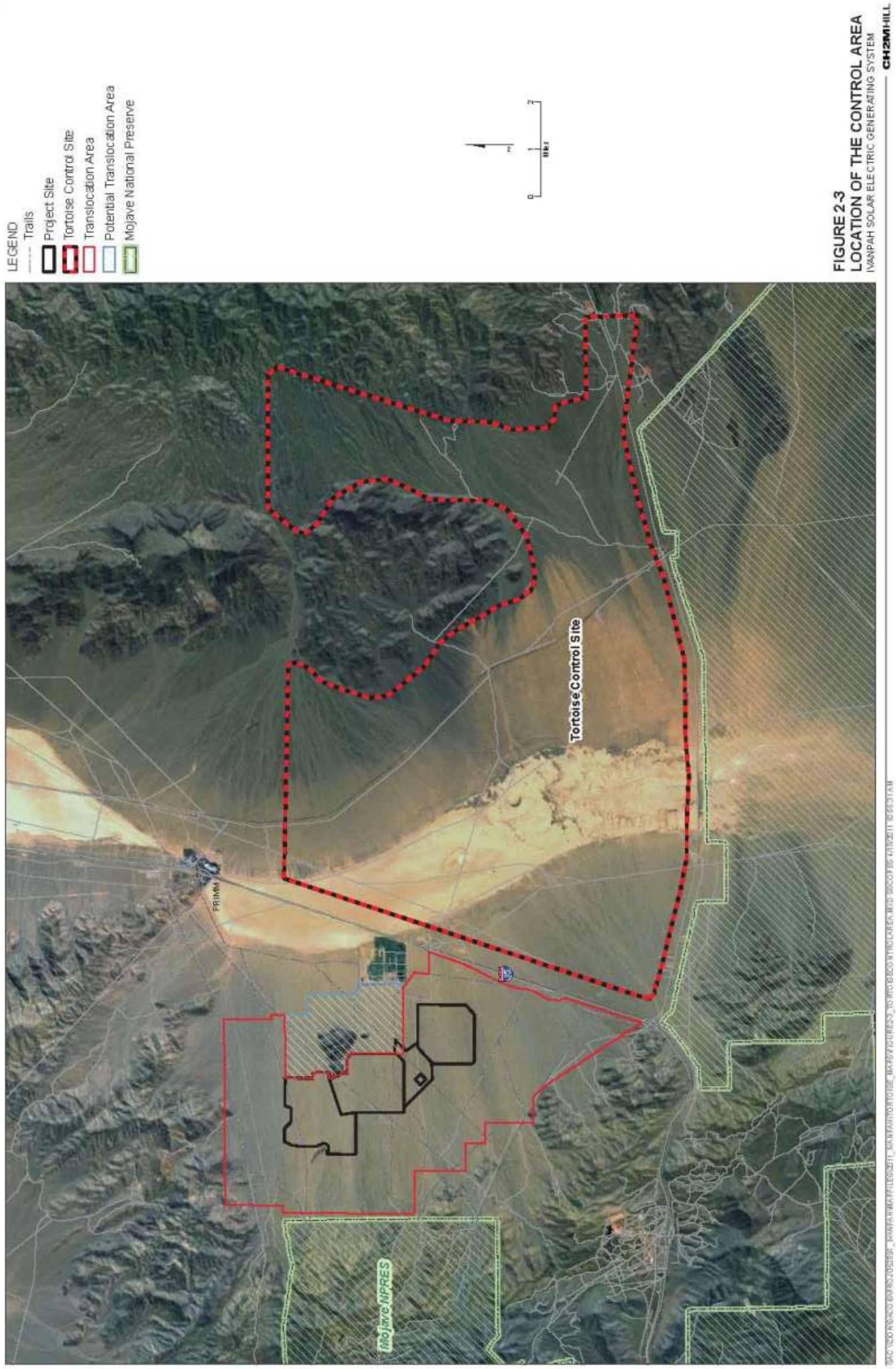

FIGURE 2-3
LOCATION OF THE CONTROL AREA
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

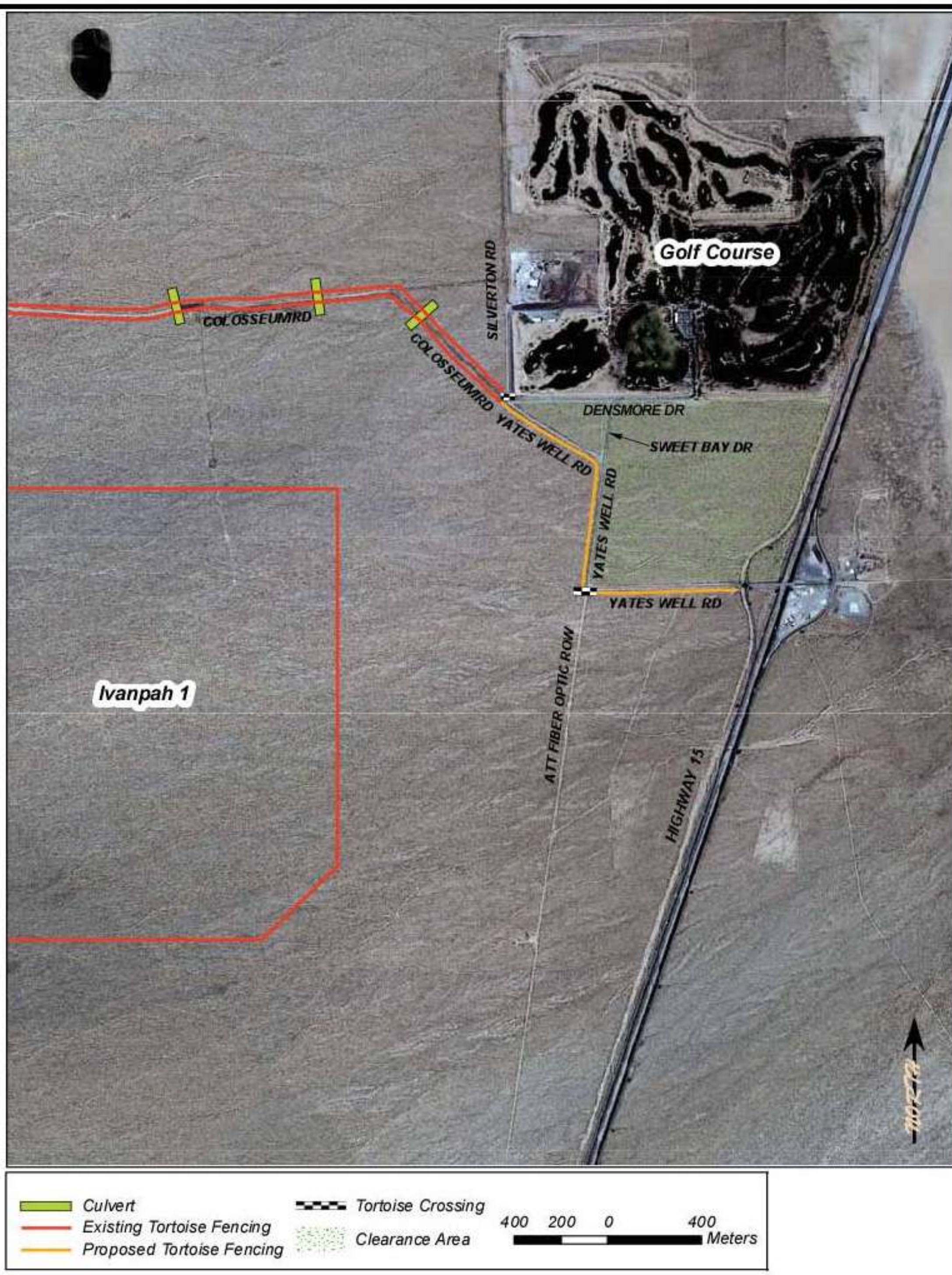

FIGURE 2-4
PROPOSED IMPROVEMENTS TO REDUCE HABITAT FRAGMENTATION
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

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SECTION 3

Revised Minimization Measures

The following subsection describes the revised measures proposed by BrightSource to avoid and minimize the potential adverse effects to the desert tortoise resulting from the Ivanpah SEGS construction and operation. Those measures, identified in the original BA, not requiring revision are not re-iterated here, but are fully incorporated in the effects analysis.

3.1 Construction Minimization Measures

This section lists revised measures (intended to minimize the impact of the taking of the desert tortoise) that would be implemented during construction of Ivanpah SEGS. Each solar plant site, also known a Unit, would be developed independently and work would not be started until financing for that phase had been secured. Hence, these minimization measures will apply to each individual power plant site/Unit.

Once approved in the BiOp, the following revised desert tortoise protection measures will be incorporated into the project owner's Biological Resources Mitigation, Implementation and Monitoring Plan (BRMIMP), which also addresses other biological resource concerns.

1. The project owner will implement a revised desert tortoise translocation/relocation plan that incorporates the changes set forth in this BA. The revised plan will be incorporated into the BRMIMP. The revised translocation plan is needed due to the increased number of tortoises that are expected to be found during construction of Ivanpah SEGS. The larger translocation area was described previously in Section 2.3 and is shown in Figure 2-2.

2. Following construction of the desert tortoise exclusion fence, the fenced area would be cleared of desert tortoises. During the first coverage all burrows that could house a desert tortoise (including rodent holes) will be excavated and the pass will not count as coverage pass. Two complete passes would then be conducted per the current 2010 FWS protocol. Transects would be no wider than 30 feet. Each separate survey would be walked in a different direction to allow opposing angles of observation. If a desert tortoise is located on the second survey, a third and fourth survey would be conducted. The authorized biologists would be primarily responsible for the clearance surveys.

3.2 Reduce Fragmentation of Habitat

As a measure to minimize fragmentation impacts from the project, it is proposed that two tortoise guards (referred to as "Tortoise Crossing" in Figure 2-4 and Attachment B) and a minimum of three culverts be installed in the area to the west and south of the golf club. The two tortoise guards would be located at the intersection of Yates Well Road and the ATT Fiber Optic line ROW and where Silverton Road meets Densmore Drive at the southwest corner of the Primm Valley Golf Club property. The three culverts (crossings) would be added where Colosseum Road will be improved to allow access underneath Colosseum. One culvert would be to the west of the golf club well on Colosseum Road, the second along Colosseum Road east of the well, and the third at Silverton and Colosseum roads, which creates a triangle with the golf club fence where tortoises could become trapped. This culvert would provide an outlet for animals that enter this fence triangle. See Figure 2-4 for the approximate location of the proposed tortoise guards and culverts.

SECTION 4

Action Area

The implementing regulations for section 7(a)(2) of the ESA define the "action area" as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). For the purposes of this BA, we consider the action area to include all areas of the proposed project, described in the Description of the Proposed Action, the proposed translocation and control areas, and all contiguous desert tortoise habitat north and west of Interstate 15, east of the Clark Mountains, and south of Primm, Nevada. By including all contiguous desert tortoise habitat west of Interstate 15, we are accounting for all areas that desert tortoises could move to following translocation based on the presence of movement barriers and the post-translocation distances observed in previous studies (Berry 1986, Field et al. 2007, Nussear 2004). The action area defined for this BA is approximately 66,688 acres and is the same as that described in the FWS October 2010 BiOp.

SECTION 5

Effects of the Proposed Action

5.1 Introduction

This section includes an analysis of the potential direct, indirect and cumulative effects to the desert tortoise resulting from revisions to the Ivanpah SEGS project, as described in this Revised Biological Assessment. . This analysis covers the entire project, including the revisions and the elements which were not revised.

5.2 Direct Effects

Direct effects are those that are caused by the proposed action and occur at the same time and place. No federally listed plants occur within the action area; therefore, no direct effects to federally listed plants are expected to occur as a result of project implementation.

Based on revised desert tortoise density estimates (Section 2.2), the Proposed Action would likely result in the relocation/translocation of between 57and 274 tortoises ≥160 mm MCL, the relocation/translocation/mortality of 608 tortoises <160 mm MCL, relocation/mortality of 236 eggs and the destruction of more than 1,000 tortoise burrows from within the project work area. There were 281 tortoise burrows excavated during clearance surveys of Unit 1 during fall 2010 surveys.

The action area is not located within designated critical habitat for the desert tortoise but is located approximately 5 miles north of the Ivanpah critical habitat unit, just north of the I-15 and Route 164 interchange.

During the life of the Project, Ivanpah SEGS would permanently remove about 3,344 acres of desert tortoise habitat. An additional 176 acres would be used for temporary laydown and temporary work space for solar plant installation. It would take many years to restore the temporary work space to baseline habitat value. Impacts from the construction of the fiber optic line are expected to be minimal because modifications to the existing distribution lines would be done using a bucket truck that would remain in the dirt service road or on foot for areas not accessible by truck. Stringing the fiber optic cable would require a 40-foot by 60-foot area every 10,000 to 20,000 feet. The work that could not be done from the existing dirt service road would be handled by vehicles driving over the existing vegetation. Desert tortoise monitors will be present during these construction activities.

Desert tortoises may be adversely affected during clearing, grubbing, mowing, grading, and trenching activities or may become entrapped within open trenches and pipes. Project actions could result in direct mortality, wounding, injury, or harassment of individuals as a result of encounters with vehicles or heavy equipment in the action area. The proposed action contains measures to minimize or eliminate the effects from vehicles straying from designated access or designated areas into adjacent habitat. Other direct effects may include individual tortoises being crushed or entombed in their burrows, disruption of tortoise behavior during construction or operation of facilities, disturbance by noise or vibrations from the heavy equipment, injury or mortality from encounters with workers' or visitors' pets, and trash that may attract predators such as such as ravens and coyotes. The worker and visitor education program minimizes but does not eliminate these potential effects. Desert tortoises may also be attracted to the construction area by application of water to control dust, placing them at higher risk of injury or mortality.

Increased human activity and vehicle travel would occur from the construction and improvement of access roads, which could disturb, injure, or kill individual tortoises. Based on minimization measures, this effect would be reduced to harass and capture, as the animals would be found and moved out of the way.

Installation of the security and exclusionary fencing could result in direct effects such as mortality, injury, or harassment of desert tortoises due to equipment operation, installation activities, removal of tortoise burrows, and tortoise translocation. The fencing would preclude desert tortoises from re-entering the work areas. This would result in fragmentation of habitat and individual home ranges. Capturing, handling, and relocating desert tortoises from the proposed site after the installation of the fencing would result in the capture and harassment, and may also result in death or physical injury. Blythe et al. (2003) found that translocated Sonoran desert tortoises moved less than 0.5 mile returned to their home ranges within a few days. Tortoises moved outside their home ranges would likely attempt to return to the area from which they were moved, making it difficult to remove them from the potential adverse effects associated with project construction. Removal of habitat within a tortoise's home range or segregating individuals from their home range with a fence would likely result in displacement stress that could result in loss of health, exposure, increased risk of predation, increased intraspecific competition, and death. Although many minimizations measures are proposed, tortoises may die or become physically injured by capture and relocation, particularly during extreme temperatures, or if they void their bladders. Averill-Murray (2001) determined that tortoises that voided their bladders during handling had significantly lower overall survival rates (0.81-0.88) than those that did not void (0.96). If multiple desert tortoises are handled by biologists without the use of appropriate protective measures and procedures, such as reusing latex gloves, pathogens may be spread among the tortoises. Minimization measures for this project identify appropriate handling temperatures and techniques and require the use of latex gloves while handling tortoises. Therefore the impact to individual tortoises should be reduced to the greatest extent practicable.

The average male tortoise home range 43.4 ha and a female's is 15.3 ha (Harless et al. 2009). Assuming a roughly circular home range, we would expect that female tortoises up to 440m from the fence line and males up to 744 m from the fence line could be affected by the project – primarily from the fencing and project construction which would exclude them from and destroy portions of their home range. For those tortoises with the home range close to the project boundary, the higher the impact would be to their daily life due to restricted access. These tortoises would shift their home range to make up for loss of their current home range to which, due to ISEGS project, they will no longer have access. The shifting of home ranges could ripple out; we anticipate that this rippling effect would go out one home range diameter (or 744 m). Therefore, we anticipate that this project will affect tortoises approximately 1500 m from the boundary fence, either from loss of home range due to fencing and project construction or due to increased tortoise density due to shifting of tortoise activity. Using the density of tortoises we calculated based on surveys surrounding the project work area, we anticipate that 203 tortoises ≥160 mm MCL and 1541 tortoises <160 mm MCL immediately surrounding the project work area would be harassed by this project. These numbers are based on our extrapolation of the Ivanpah Valley Line Distance Sampling data. When we get the survey protocol results from surveying the 2 km buffer around the project work area, these numbers will be updated.

Effects that could not be avoided or appropriately minimized are proposed to be offset with habitat enhancement actions (refer to Attachment A). These compensatory actions include acquiring 3582 acres of tortoise habitat in the North East Mojave Recovery Unit or conducting habitat enhancement and restoration on existing public lands, or a combination. The beneficial effects of the land acquisition would be to bring additional tortoise habitat under a conservation management strategy which would result in providing additional quality habitat for the tortoise and increase the likely hood of long term survival. There would be no short term effects of acquisition. Habitat enhancement and restoration on public land, including fencing of roadways, would result in higher habitat values for tortoise, decrease the likelihood of tortoise being killed or wounded by vehicular traffic, increase habitat connectivity, and increase the likelihood of long term survival. The adverse effects of enhancement and restoration would be the capture and harassment of individuals moved out of the way of the fence construction or the restoration action. Tortoises may also be harassed, killed or wounded as a result of contact with work vehicles, but the likelihood is low due to minimization measures.

In conclusion, although comprehensive avoidance, minimization and compensatory measures are incorporated into the proposed project description, the direct effects of the proposed action will still result in the loss of 3520 acres of tortoise habitat inside the work area, capture and harassment of 57-274 tortoises ≥160mm MCL, the relocation/translocation/mortality of 608 tortoises <160 mm MCL, relocation/mortality of 236 eggs and the destruction of more than 1,000 tortoise burrows from within the project work area, and 203 tortoises ≥160 mm MCL and 1541tortoises <160 mm MCL harmed and harassed outside the work areas in the action area. Additionally, 114 -548 tortoise ≥160mm MCL and up to 200 tortoises <160 mm MCL would be captured and harassed as part of the effectiveness monitoring program for the resident and control study groups. The response of the tortoise to these effects will be a temporary loss of reproductive productivity in the action area and an increase in the likelihood of disease vectoring due to increases in contact between individuals in the translocation areas and stress from capturing, movement and loss of access to established home ranges.

5.3 Indirect Effects

Indirect effects are those that are caused by, or result from, the Proposed Action and are later in time, but reasonably certain to occur. In contrast to direct effects, indirect effects are more subtle, and may affect individuals and populations and habitat quality over an extended period of time, long after construction activities have been completed. Indirect effects are of particular concern for long-lived species such as the desert tortoise because project-related effects may not become evident in individuals or populations until years later.

The intent of revisions to the translocation areas and protocols is to move translocated desert tortoise shorter distances and to repopulate the area between I-15 and Unit 1. If successful, these measures should both increase the survivorship of displaced animals and aid in the repopulation of an area impacted by the presence of I-15.

Habitat quality in the action area may be reduced with the potential introduction of invasive plant species from the work area. Additionally, the introduction of noxious weeds may lead to increased wildfire frequency (Brooks et al., 2003). Other potential indirect effects include the permanently fenced area acting as barriers that would impede any long-term natural movements of desert tortoises attempting to return to their original home ranges and burrows.

The potential for severe long-term effects include collisions and collections along the paved access roads where vehicle frequency and speed is generally greatest. Census data indicate that desert tortoise numbers decline as vehicle use increases (Bury et al., 1977) and that tortoise sign increases with increased distance from roads (Nicholson, 1978). Additional effects that may occur from casual use of the access roads in the vicinity of the action area include unauthorized trail creation and off-highway vehicle use. The proposed Ivanpah SEGS would be the largest solar facility of its kind at this time and could attract public curiosity that would result in greater disturbance of the surrounding habitat and potential collection and other take of desert tortoise.

Human activities may provide food in the form of trash and litter or water that attracts tortoise predators such as the common raven, desert kit fox, feral dogs, and coyote (Berry, 1997 Bureau, 1990). Facility infrastructure such as power poles could provide perching and nesting opportunities for ravens. Natural predation rates may be altered or increased when natural habitats are disturbed or modified. Common raven populations in some areas of the Mojave Desert have increased 1,500 percent from 1968 to 1988 in response to expanding human use of the desert (Boarman, 2002). Since ravens were scarce in the Mojave Desert prior to 1940, the current level of raven predation on juvenile desert tortoises is considered to be an unnatural occurrence (Bureau, 1990). Dogs may range several miles into the desert and have been found digging up and killing desert tortoises (USFWS, 1994a; Evans, 2001). Dogs brought to the project site with visitors over the life of the ROW may harass, injure, or kill desert tortoises, particularly if allowed off leash to roam freely.

In conclusion, the indirect effects of the project will likely occur for the duration of the ROW grant and will be a continual stressor on the reproductive health and population in the action area.

5.4 Cumulative Effects

Cumulative effects are of those future state and private activities, excluding federal activities that are reasonably foreseeable. There has been no change in the cumulative effects between the FWS Oct 2010 BiOp and this BA.

BLM's Estimation of Take

Harm: BLM anticipates the loss or significant degradation of 3520 acres of tortoise habitat that is likely to result in the harm 57-274 tortoises ≥160mm MCL, 608 tortoises <160 mm MCL, and 236 eggs inside the work area and 203 tortoises ≥160 mm MCL and 1541tortoises <160 mm MCL outside the work area).

During the life of the Project, Ivanpah SEGS would permanently remove about 3,344 acres of desert tortoise habitat. An additional 176 acres would be used for temporary laydown and temporary work space for solar plant installation. Impacts from the construction of the fiber optic line are expected to be minimal because modifications to the existing distribution lines would be done using a bucket truck that would remain in the dirt service road or on foot for areas not accessible by truck. Stringing the fiber optic cable would require a 40-foot by 60-foot area every 10,000 to 20,000 feet. The work that could not be done from the existing dirt service road would be handled by vehicles driving over the existing vegetation.

Harass: BLM anticipates harassment of all tortoises within the action area, including the work area, translocation sites, control area, and areas within 2.0 km of the work area. Based on data above, we estimate this to be 1025 tortoises ≥ 160 mm MCL and 2349 tortoises < 160 mm MCL.

In conclusion, although comprehensive avoidance, minimization and compensatory measures are incorporated into the proposed project description, the direct effects of the proposed action will still result in the loss of 3520 acres of tortoise habitat inside the work area, capture and harassment of 57-274 tortoises ≥160mm MCL, the relocation/translocation/mortality of 608 tortoises <160 mm MCL, relocation/mortality of 236 eggs and the destruction of more than 1,000 tortoise burrows from within the project work area, and 203 tortoises ≥160 mm MCL and 1541tortoises <160 mm MCL harmed and harassed outside the work areas in the action area. Additionally, 114 -548 tortoise ≥160mm MCL and up to 200 tortoises <160 mm MCL would be captured and harassed as part of the effectiveness monitoring program for the resident and control study groups. The response of the tortoise to these effects will be a temporary loss of reproductive productivity in the action area and an increase in the likelihood of disease vectoring due to increases in contact between individuals in the translocation areas and stress from capturing, movement and loss of access to established home ranges.

Capture/Collect:

<u>In Work Area:</u> BLM anticipates to capture/collect as many as 162 adult tortoises ≥160 mm MCL (likely range 86-162 tortoises), from within the work area and would incorporate all of these individuals into the EMP outlined above.

Because smaller tortoises, <160mm MCL, are difficult to find, we anticipate being able to locate approximately 10-15 percent of the individuals in the work area. With an estimated population of 608 non-adults in the work area, the number captured/collected based on our conservative calculation would be 60-90. All of the non-adults captured/collected would be incorporated into the EMP outlined above.

If females remain on site within Units 2 and 3 during a breeding season (late April thru mid June), we anticipate approximately 236 eggs being laid. (All females have been cleared from Unit 1, thus no eggs can be laid within that unit. However, there could be as many as 50 eggs laid in the holding pens). While finding nests is difficult, if we do, we would move the eggs into constructed nests within the holding pens and any hatchlings would then be incorporated into the Juvenile Survival Program component of the translocation plan.

<u>Resident Population:</u> In the resident population, as many as 162 tortoises ≥160 mm MCL (likely range between 86-162 tortoises), including those animals for the ongoing monitoring and disease testing will be captured and included as part of the EMP. Additionally, we anticipate capturing 60-90 juveniles <160 mm MCL in the resident population and incorporating into the EMP.

For animals within the resident population that occur near the work area, we anticipate approximately 900 individuals will need to be picked up and moved out of harms way and that some of these animals might require multiple capture events to move out of harm's way.

<u>Control Population:</u> In the control population, as many as 162 tortoises ≥160 mm MCL (likely range between 86-162 control tortoises), including those animals for the ongoing monitoring and disease testing will be captured and included as part of the EMP. Additionally, we anticipate capturing 60-90 juveniles <160 mm MCL in the control population and incorporating into the EMP.

Wound/Kill: BLM estimates three adult tortoises ≥160 mm MCL per year and a total of nine may be wounded or killed during the three years of the construction phase. We estimate that during the operation phase one adult tortoise per year will be wounded or killed for a total of 10 adult tortoises during the operations phase.

Because of their small size, cryptic nature, and short time conducting above-ground activities, BLM believes that non-adult tortoises will be killed during the construction phase and that many of those fatalities will not be found. We believe that 90 percent of the non-adult tortoises will be killed during the construction phase and only 10 percent of those will be found. BLM estimates that the number of mortality take of non-adult tortoises (<160 mm MCL), 90 percent of those in the work area, will be 547 per year and a maximum of 700 during the 3-year construction phase. BLM estimates that a total of 20 non-adult tortoises (<160 mm MCL) during the operations phase will be killed.

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ATTACHMENT A

Habitat Enhancement Plan

Desert Tortoise Habitat Enhancement Plan: Adjacent Parcels

Ivanpah Solar Electric Generating System

(CACA-48668, 49502, 49503, 49504)

Submitted to

The US Fish & Wildlife Service and
The Bureau of Land Management

Submitted by

Solar Partners I, LLC; Solar Partners II, LLC;
and Solar Partners VIII, LLC

December 9, 2010

With Assistance from

CH2MHILL
2485 Natomas Park Drive
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Sacramento, CA 95833

and

SUNDANCE BIOLOGY, INC.
179 Niblick Rd. PMB 272
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Desert Tortoise Habitat Enhancement Plan: Adjacent Parcels

5.1 Introduction

The Biological Opinion on BrightSource Energy's Ivanpah Solar Electric Generating System Project (ISEGS), San Bernardino County, California (2010) requires Bright Source Energy (BSE) to "compensate for loss of desert tortoise habitat in accordance with the Northern and Eastern Mojave amendment to the California Desert Conservation Area (CDCA) Plan." As set forth in the CDCA Plan, a compensation ratio of 1: 1 is required. This compensation requirement, as described in the BO, states in part:

> "The Bureau will require BrightSource to compensate for loss of desert tortoise habitat in accordance with the Northern and Eastern Mojave amendment to the California Desert Conservation Area (CDCA) Plan (Bureau 2002). The Bureau will apply a compensation ratio of 1:1, as described in this plan. This compensation will provide for acquisition of up to 3,582 acres of land in the Northeastern Mojave Recovery Unit, or desert tortoise habitat enhancement or rehabilitation activities on existing public land, or some combination of the two. The following is a list of potential habitat enhancement and rehabilitation actions, identified by the Bureau, that could be implemented solely or in combination with land acquisition to fulfill the Bureau's compensation requirements:
>
> 1. Install at least 50 miles of desert tortoise exclusion fencing along the following road segments: a) Interstate 15 between Nipton Road and Ivanpah Dry Lake, b) U.S. Highway 95 through Piute Valley from the California-Nevada state line to Goffs Road, c) Nipton Road, between the California-Nevada border and Interstate 15, and d) Ivanpah Road, from Nipton Road through portions of the Mojave National Preserve.
> 2. Restore habitat, including vertical mulching, of at least 50 routes that the Bureau has designated as closed in the Shadow Valley, Piute Valley, and Ivanpah Valley Desert Wildlife Management Areas.
> 3. Install three-strand fencing or other suitable fencing around the boundary of the towns of Nipton and Goffs.
> 4. Remove exotic plant species from areas important to desert tortoises.
> 5. Identify and clean up destroyed or damaged habitat areas, such as illegal dumpsites and illegal routes, in Shadow Valley, Piute Valley, Ivanpah Valley, and the critical habitat portions of Mojave National Preserve.
> 6. Fund desert tortoise head start research, if approved by the Service's Desert Tortoise Recovery Office.

In partial fulfillment of the compensation requirement, BSE proposes another activity for the Service's consideration. That is, to provide desert tortoise habitat enhancement of lands adjacent to the Ivanpah Solar Electric Generating System (ISEGS) project.

5.2 Proposed Enhancement of Adjacent Parcels

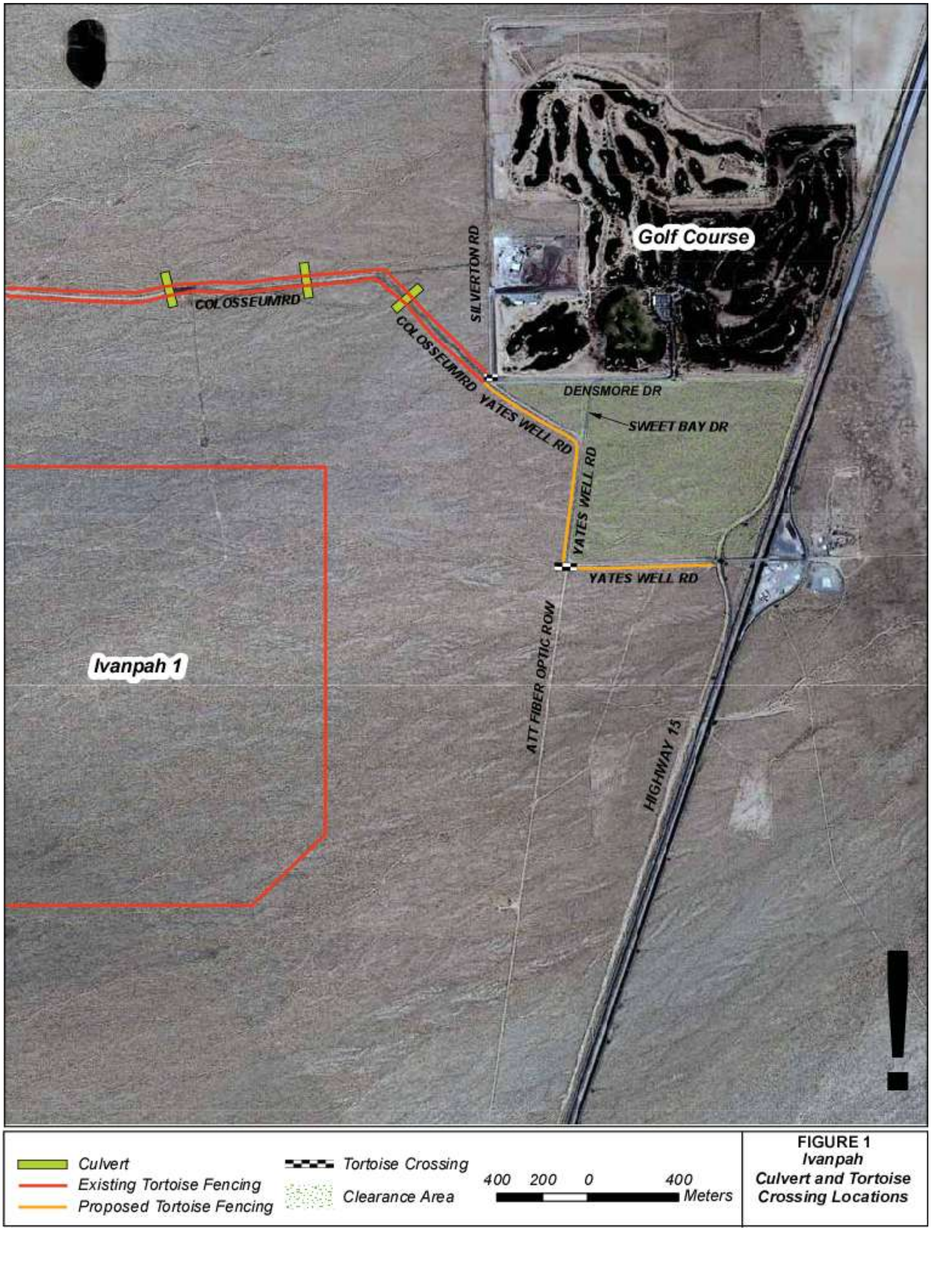
It is proposed that desert tortoise habitat in the vicinity of the Ivanpah SEGS project will be benefitted by the addition of two tortoise crossings and three culverts. The tortoise crossings would be located at the intersection of Yates Well Road and the ATT Fiber Optic line ROW and where Silverton Road meets Densmore Drive at the southwest corner of the Primm Valley Golf Club property. The three culverts would be added where the road will be improved. One culvert would be to the west of the golf club well on Colosseum Road, the second along Colosseum Road east of the well and the third along Colosseum Road after it turns southeast to meet Yates Well Road. See Figure 1 for the approximate location of the proposed tortoise crossings and culverts.

As shown in Figure 1 the desert tortoise exclusion fence will tie into the existing fence on the southwest side of Colosseum Road and extend along the southwestern, western, and southern edges of Yates Well Road to the I-15 south bound on-ramp. The southern tortoise crossing will be installed across the intersection of Yates Well Road and the ATT Fiber Optic line ROW and will shunt tortoises back to the west of Yates Well Road. The northern tortoise crossing will tie into the existing fence on the northwest side of Colosseum road and cross Silverton Road shunting tortoises back to the north of Colosseum Road. Any tortoises found in the area east and north of Yates Well Road will be removed and placed west and south of Yates Well Road.

5.3 Need for Enhancement Measures

These enhancement measures will improve the mobility of desert tortoises within this portion of the Ivanpah Valley by allowing them to move between the area to the north and east of Ivanpah SEGS and to the area to the south of the project. It will also isolate them from traffic between the I-15 and the golf course.

FIGURE 1. APPROXIMATE LOCATIONS OF GATES AND CULVERTS.



ATTACHMENT B.
Master List of Desert Tortoise Encountered, Marked, and Relocated

Tort ID	Pen	Frequency	Transmitter Date	UTM Initial Easting	UTM Initial Northing	Initial Location	Current Location	Sex	MCL	Weight (g)	Health	Blood	ELISA Status M. agassizii	ELISA Status M. testudineum	Comments
BS1	4	164.9898	9-Oct-10	640350	3933225	Ivanpah 1	Pen	Female	188	1350	Y	Y			
BS10		164.5937	14-Oct-10	639430	3934161	Ivanpah 1	Outside Construction Site	Male	277	3650	N	N			
BS100		164.7678	12-Oct-10	639347	3933950	Outside Construction Site	Outside Construction Site	Male	245	3050	N	N			
BS101		164.396	14-Oct-10	640852	3934585	Outside Construction Site	Outside Construction Site	Male	276	4260	N	N			
BS102		164.3562	14-Oct-10	639037	3937147	Outside Construction Site	Outside Construction Site	Male	271	3800	N	N			
BS103	16	164.57	15-Oct-10	640419	3934583	Outside Construction Site	Pen	Male	251	3600	N	N			
BS104	DEAD	164.332	15-Oct-10	639259	3937355	Outside Construction Site	DEAD	Male	265	3275	N	N			Probable Kill by Golden Eagle
BS105		165.681	2-Apr-11	636768	3939243	Fence line - Ivan 3	Outside Construction Site	Male	253		N	N			
BS106	32			637737	3938904	Fence line - Ivan 3	Pen	Unknown	68		N	N			
BS107		164.411	2-Apr-11	636786	3939244	Outside Construction Site	Outside Construction Site	Female	232		N	N			
BS108		164.208	2-Apr-11	636738	3939269	Fence line - Ivan 3	Outside Construction Site	Male	264		N	N			
BS109		165.662	3-Apr-11	636789	3939239	Outside Construction Site	Outside Construction Site	Male	267		N	N			
BS11		164.145	28-Mar-11	640716	3934772	Outside Construction Site	Outside Construction Site	Female	202	1780	Y	Y			
BS110		164.798	3-Apr-11	636669	3937700	Ivanpah 3	Ivanpah 3	Male	270		N	N			
BS111		164.24	3-Apr-11	641353	3933284	Fence line - Ivan 2	Outside Construction Site	Female	227		Y	N			
BS112	18			638834	3934245	Common West	Pen	Unknown	44		N	N			
BS113		164.883	4-Apr-11	641357	3934209	Fence line - Ivan 1	Outside Construction Site	Male	230		N	N			
BS114		164.5759	5-Apr-11	636256	3937190	Fence line - Ivan 3	Fence line - Ivanpah 3	Male	272		N	N			
BS115	32			636267	3937199	Fence line - Ivan 3	Fence line - Ivanpah 3	Unknown	64		N	N			
BS116		165.551	6-Apr-11	638839	3938236	Fence line - Ivan 3	Fence line - Ivanpah 3	Female	190		N	N			
BS117		164.983	6-Apr-11	638476	3936437	Ivanpah 2	Ivanpah 2	Male	231		N	N			

Tort ID	Pen	Frequency	Transmitter Date	UTM Initial Easting	UTM Initial Northing	Initial Location	Current Location	Sex	MCL	Weight (g)	Health	Blood	ELISA Status M. agassizii	ELISA Status M. testudineum	Comments
BS118		163.245	10-Apr-11	637693	3938905	Fence line - Ivan 3	Fence line - Ivanpah 3	Unknown	121		N	N			
BS119				641353	3933716	Outside Construction Site	Outside Construction Site	Unknown	57		N	N			
BS12		164.506	16-Oct-10	641235	3934835	Outside Construction Site	Outside Construction Site	Female	206	1690	Y	Y			
BS13		164.0188	29-Mar-11	640238	3932655	Ivanpah 1	Outside Construction Site	Male	245	2525	Y	Y			
BS14	6	167.1954	19-Oct-10	640990	3934584	Ivanpah 1	Pen	Female	224	2250	Y	Y			
BS15		164.603	19-Oct-10	639394	3934807	Outside Construction Site	Outside Construction Site	Unknown	190	1425	N	N			
BS16		165.507	6-Apr-11	638594	3933593	Outside Construction Site	Outside Construction Site	Female	224	2140	N	N			
BS17	17	164.98	20-Oct-10	639883	3934739	Common East	Pen	Unknown	116	320	Y	Y			
BS18	34	163.657	20-Oct-10	639939	3933769	Ivanpah 1	Pen	Unknown	71	85	Y	Y			
BS19		163.3896	29-Mar-11	640247	3934590	Ivanpah 1	Outside Construction Site	Unknown	118	365	N	N			
BS2	9	164.95	9-Oct-10	641066	3933876	Ivanpah 1	Pen	Male	261	3520	Y	Y	Suspect	Suspect	
BS20	DEAD		20-Oct-10	639127	3935451	DEAD	DEAD	Female			N	N			Euthanized-Vehicle Impact, Not ISEGS
BS21		164.101	29-Mar-11	639987	3932661	Ivanpah 1	Outside Construction Site	Male	241	2790	Y	Y			
BS22	7	167.654	22-Oct-10	639529	3933778	Ivanpah 1	Pen	Male	252	2340	Y	Y			
BS23		164.661	4-Apr-11	636881	3935977	Outside Construction Site	Outside Construction Site	Female	242	2700	N	N			
BS24		163.973	25-Oct-10	638849	3934938	Outside Construction Site	Ivanpah 2	Unknown	179	1290	Y	Y		Suspect	
BS25	3		26-Oct-10	640355	3934485	Ivanpah 1	Pen	Unknown	168	1120	Y	Y			
BS26	17		27-Oct-10	640972	3933818	Ivanpah 1	Pen	Unknown	123	370	Y	Y			
BS27	15		28-Oct-10	639489	3934465	Common East	Pen	Female	232	2150	Y	Y			
BS28	1		28-Oct-10	639726	3933755	Ivanpah 1	Pen	Female	217	2060	Y	Y			
BS29	2		28-Oct-10	640002	3933726	Ivanpah 1	Pen	Male	265	3325	Y	Y			
BS3		164.9286	10-Oct-10	639871	3934573	Common East	Outside Construction Site	Female	227	2300	N	N			
BS30		165.744	29-Mar-11	636934	3940352	Outside Construction Site	Outside Construction Site	Male	238	3000	Y	Y			
BS31	20		29-Oct-10	639991	3934351	Ivanpah 1	Pen	Unknown	133	530	Y	Y	Suspect	Positive	

Tort ID	Pen	Frequency	Transmitter Date	UTM Initial Easting	UTM Initial Northing	Initial Location	Current Location	Sex	MCL	Weight (g)	Health	Blood	ELISA Status M. agassizii	ELISA Status M. testudineum	Comments
BS32	8		29-Oct-10	640059	3933947	Ivanpah 1	Pen	Male	252	3160	Y	Y			
BS33		165.6942	5-Apr-11	637391	3938919	Outside Construction Site	Fence line - Ivanpah 3	Female	225	2220	Y	Y			
BS34	5		29-Oct-10	639636	3934139	Ivanpah 1	Pen	Female	214	2050	Y	Y			
BS35	35		29-Oct-10	640933	3933875	Ivanpah 1	Pen	Unknown	143	640	Y	Y			
BS36	33		30-Oct-10	640650	3934568	Ivanpah 1	Pen	Unknown	150	720	Y	Y			
BS37	12		30-Oct-10	638658	3935988	Ivanpah 2	Pen	Male	243	2400	Y	Y	Suspect	Positive	
BS38	13		30-Oct-10	640084	3934237	Ivanpah 1	Pen	Female	223	2390	Y	Y		Positive	
BS39	34		1-Nov-10	640640	3933644	Ivanpah 1	Pen	Unknown	61	46	Y	N			
BS4		164.8672	10-Oct-10	639800	3934476	Ivanpah 1	Outside Construction Site	Male	250	2910	Y	Y			
BS40	34		1-Nov-10	640935	3933624	Ivanpah 1	Pen	Unknown	69	72	Y	N			
BS41	17		1-Nov-10	640891	3934502	Ivanpah 1	Pen	Unknown	118	390	Y	Y			
BS42	18		17-Dec-10	639644	3933806	Ivanpah 1	Pen	Unknown	48		N	N			
BS43	18		20-Dec-10	639353	3932915	Ivanpah 1	Pen	Unknown	46		N	N			
BS44	10		16-Feb-11	640737	3934176	Ivanpah 1	Pen	Female	194	1525	N	N			
BS45		164.753	5-Mar-11	639180	3938043	Outside Construction Site	Outside Construction Site	Female	223	2000	Y	N			
BS46		163.927	5-Mar-11	637784	3938418	Ivanpah 3	Fence line - Ivanpah 3	Female	209	1980	Y	N			
BS47		167.0728	8-Mar-11	637026	3938917	Ivanpah 3	Ivanpah 3	Female	242	2675	N	N			
BS48	34		9-Mar-11	638736	3936082	Ivanpah 2	Pen	Unknown	86	160	N	N			
BS49		164.832	9-Mar-11	636682	3939138	Fence line - Ivan 3	Ivanpah 3	Male	209	1750	N	N			
BS5		164.792	10-Oct-10	639195	3935431	Ivanpah 2	Ivanpah 2	Male	216	1880	N	N			
BS50		165.721	11-Mar-11	638214	3938852	Ivanpah 3	Ivanpah 3	Male	202	1640	N	N			
BS500		164.712	31-Mar-11	658928	3929206	Control Site	Control Site	Female	243	2830	N	N			
BS501		164.311	1-Apr-11	655769	3927876	Control Site	Control Site	Female	189		N	N			
BS502		164.515	1-Apr-11	652032	3933458	Control Site	Control Site	Female	217		N	N			
BS503		164.2326	1-Apr-11	654949	3928632	Control Site	Control Site	Male	338		N	N			
BS504		164.3784	1-Apr-11	655064	3928395	Control Site	Control Site	Female	198		N	N			
BS505		164.492	1-Apr-11	653002	3932792	Control Site	Control Site	Male	213		N	N			
BS506		165.981	1-Apr-11	656989	3927840	Control Site	Control Site	Male	252		N	N			
BS507		164.3028	1-Apr-11	654898	3928759	Control Site	Control Site	Female	221		N	N			
BS508		164.108	1-Apr-11	654897	3929066	Control Site	Control Site	Male	237		N	N			

Tort ID	Pen	Frequency	Transmitter Date	UTM Initial Easting	UTM Initial Northing	Initial Location	Current Location	Sex	MCL	Weight (g)	Health	Blood	ELISA Status M. agassizii	ELISA Status M. testudineum	Comments
BS509		163.7836	1-Apr-11	654818	3928643	Control Site	Control Site	Unknown	169		N	N			
BS51		165.4114	11-Mar-11	637813	3938363	Ivanpah 3	Ivanpah 3	Male	234	2300	N	N			
BS510		165.96	1-Apr-11	656930	3927606	Control Site	Control Site	Male	256		N	N			
BS511		165.941	1-Apr-11	654855	3928807	Control Site	Control Site	Female	221		N	N			
BS512		164.319	1-Apr-11	655123	3929288	Control Site	Control Site	Male	272		N	N			
BS513		165.876	1-Apr-11	655028	3928853	Control Site	Control Site	Female	225		N	N			
BS514		163.4754	2-Apr-11	654705	3928835	Control Site	Control Site	Unknown	158		N	N			
BS515		165.025	2-Apr-11	656897	3927470	Control Site	Control Site	Female	213		N	N			
BS516				651289	3932516	Control Site	Control Site	Unknown	48		N	N			
BS517		163.985	2-Apr-11	653363	3932175	Control Site	Control Site	Male	220		N	N			
BS518		163.1996	2-Apr-11	654666	3928903	Control Site	Control Site	Unknown	122		N	N			
BS519		164.1822	2-Apr-11	651497	3932599	Control Site	Control Site	Female	206		N	N			
BS52	14		10-Mar-11	637219	3938658	Ivanpah 3	Pen	Male	176	1140	N	N			
BS520		163.568	2-Apr-11	656893	3927835	Control Site	Control Site	Unknown	130		N	N			
BS521		163.1777	2-Apr-11	654571	3929045	Control Site	Control Site	Unknown	137		N	N			
BS522		164.1979	2-Apr-11	651220	3932439	Control Site	Control Site	Male	269		N	N			
BS523		164.5899	2-Apr-11	654550	3929197	Control Site	Control Site	Female	225		N	N			
BS524		165.081	2-Apr-11	655249	3929327	Control Site	Control Site	Male	257		N	N			
BS525				655260	3929690	Control Site	Control Site	Unknown	49		N	N			
BS526				655258	3928431	Control Site	Control Site	Unknown	88		N	N			
BS527		165.952	2-Apr-11	654854	3930046	Control Site	Control Site	Female	202		N	N			
BS528				655257	3929723	Control Site	Control Site	Unknown	65		N	N			
BS529		165.0957	2-Apr-11	655951	3927964	Control Site	Control Site	Male	233		N	N			
BS53	18		10-Mar-11	639456	3934378	Common East	Pen	Unknown	46	21	N	N			
BS530		165.8006	2-Apr-11	654185	3930136	Control Site	Control Site	Female	205		N	N			
BS531		165.001	2-Apr-11	654791	3930036	Control Site	Control Site	Female	203		N	N			
BS532		165.8169	2-Apr-11	654206	3930110	Control Site	Control Site	Female	203		N	N			
BS533		165.8575	2-Apr-11	655289	3928226	Control Site	Control Site	Female	200		N	N			
BS534		164.923	2-Apr-11	653188	3932704	Control Site	Control Site	Male	226		N	N			
BS535		164.766	2-Apr-11	654587	3930004	Control Site	Control Site	Male	238		N	N			
BS536		163.185	2-Apr-11	655379	3928526	Control Site	Control Site	Unknown	122		N	N			
BS537		165.401	3-Apr-11	651538	3932920	Control Site	Control Site	Male	236		N	N			

Tort ID	Pen	Frequency	Transmitter Date	UTM Initial Easting	UTM Initial Northing	Initial Location	Current Location	Sex	MCL	Weight (g)	Health	Blood	ELISA Status M. agassizii	ELISA Status M. testudineum	Comments
BS538		167.333	3-Apr-11	655494	3929774	Control Site	Control Site	Female	216		N	N			
BS54	18		12-Mar-11	637505	3937703	Ivanpah 3	Pen	Unknown	47	22	N	N			
BS55		164.008	12-Mar-11	640032	3939553	Outside Construction Site	Outside Construction Site	Female	226	2120	N	N			
BS56		163.8658	14-Mar-11	636302	3938049	Outside Construction Site	Outside Construction Site	Male	236	2525	N	N			
BS57		163.8242	14-Mar-11	636607	3937914	Fence line - Ivan 3	Ivanpah 3	Female	218	1925	N	N			
BS58		163.375	15-Mar-11	637400	3938281	Ivanpah 3	Ivanpah 3	Unknown	138	620	N	N			
BS59		163.065	15-Mar-11	637445	3938879	Fence line - Ivan 3	Fence line - Ivanpah 3	Unknown	67	69	N	N			
BS6		164.6327	11-Oct-10	640373	3934551	Ivanpah 1	Outside Construction Site	Male	257	2700	N	N			
BS60		163.6243	15-Mar-11	640728	3932365	Outside Construction Site	Outside Construction Site	Unknown	173	1325	N	N			
BS61		164.04	15-Mar-11	638198	3935411	Ivanpah 2	Ivanpah 2	Female	217	1975	N	N			
BS62		163.8976	15-Mar-11	637330	3938440	Ivanpah 3	Ivanpah 3	Male	200	1460	N	N			
BS63	18		16-Mar-11	638819	3938200	Fence line - Ivan 3	Pen	Unknown	40	12	N	N			
BS64		163.8756	16-Mar-11	636766	3939132	Fence line - Ivan 3	Ivanpah 3	Male	199	1650	N	N			
BS65		164.7018	16-Mar-11	636478	3936703	Fence line - Ivan 3	Ivanpah 3	Female	210	1775	N	N			
BS66		165.92	16-Mar-11	638662	3937975	Ivanpah 3	Ivanpah 3	Female	190	1500	N	N			
BS67	34		16-Mar-11	638843	3936520	Ivanpah 2	Pen	Unknown	71	84	N	N			
BS68		165.6276	16-Mar-11	638080	3935518	Ivanpah 2	Ivanpah 2	Male	265	3600	N	N			
BS69		165.911	16-Mar-11	638855	3937527	Fence line - Ivan 2	Ivanpah 3	Male	251	2800	N	N			
BS7		163.7512	12-Oct-10	639464	3934298	Common East	Outside Construction Site	Unknown	94	185	N	N			
BS70		163.511	17-Mar-11	638264	3939094	Fence line - Ivan 3	Outside Construction Site	Unknown	131	550	N	N			
BS71		163.92	17-Mar-11	636972	3939010	Ivanpah 3	Ivanpah 3	Female	216	1960	N	N			
BS72	34		21-Mar-11	638891	3937116	Ivanpah 2	Pen	Unknown	57	43	N	N			
BS73	DEAD		22-Mar-11	638848	3939085	Fence line - Ivan 3	DEAD	Unknown	47		N	N			Killed During Initial Grubbing of Fenceline
BS74		165.8322	22-Mar-11	640759	3932652	Outside Construction Site	Outside Construction Site	Male	176	1150	N	N			
BS75		163.074	22-Mar-11	636209	3936707	Outside Construction Site	Fence line - Ivanpah 3	Unknown	83	99	N	N			
BS76		164.162	23-Mar-11	637106	3936621	Outside Construction Site	Fence line - Ivanpah 3	Female	226	2130	N	N			

Tort ID	Pen	Frequency	Transmitter Date	UTM Initial Easting	UTM Initial Northing	Initial Location	Current Location	Sex	MCL	Weight (g)	Health	Blood	ELISA Status M. agassizii	ELISA Status M. testudineum	Comments
BS77		165.5718	23-Mar-11	639040	3935126	Ivanpah 2	Ivanpah 2	Female	228	2000	N	N			
BS78		164.843	28-Mar-11	638846	3937579	Ivanpah 2	Outside Construction Site	Male	248		N	N			
BS79		164.784	28-Mar-11	638814	3936975	Ivanpah 2	Fence line - Ivanpah 2	Female	243		N	N			
BS8		164.6106	12-Oct-10	641354	3934202	Ivanpah 1	Outside Construction Site	Female	209	1800	N	N			
BS80		164.806	28-Mar-11	637365	3938905	Ivanpah 3	Fence line - Ivanpah 3	Male	255		N	N			
BS81		164.904	28-Mar-11	636373	3936974	Ivanpah 3	Ivanpah 3	Male	254		N	N			
BS82		165.707	28-Mar-11	637409	3938533	Ivanpah 3	Ivanpah 3	Male	217		N	N			
BS83	DEAD	163.832	29-Mar-11	638836	3938764	Fence line - Ivan 3	DEAD	Male	257		N	N			Died of Hypothermia Walking Along Silt Fence
BS84		164.678	29-Mar-11	637020	3939138	Fence line - Ivan 3	Outside Construction Site	Male	237		N	N			
BS85		163.162	29-Mar-11	636681	3939089	Fence line - Ivan 3	Outside Construction Site	Unknown	136		N	N			
BS86		164.4428	29-Mar-11	636762	3938199	Ivanpah 3	Outside Construction Site	Male	251		N	N			
BS87		163.013	29-Mar-11	637556	3938871	Fence line - Ivan 3	Fence line - Ivanpah 3	Unknown	72		N	N			
BS88		164.461	29-Mar-11	638316	3935688	Ivanpah 2	Ivanpah 2	Male	272		N	N			
BS89		164.287	29-Mar-11	640109	3939522	Outside Construction Site	Outside Construction Site	Male	250		N	N			
BS9	11	164.145	14-Oct-10	641337	3934152	Ivanpah 1	Pen	Male	261	3360	Y	Y			
BS90		165.733	29-Mar-11	637853	3938893	Fence line - Ivan 3	Ivanpah 3	Male	270		N	N			
BS91		164.8206	29-Mar-11	636693	3939150	Fence line - Ivan 3	Ivanpah 3	Female	235		N	N			
BS92		164.391	31-Mar-11	638905	3936512	Ivanpah 2	Outside Construction Site	Male	269		N	N			
BS93		164.562	31-Mar-11	636575	3937958	Fence line - Ivan 3	Fence line - Ivanpah 3	Male	292		N	N			
BS94		164.4218	31-Mar-11	638294	3937694	Ivanpah 3	Ivanpah 3	Female	211		N	N			
BS95		164.522	31-Mar-11	638367	3938573	Ivanpah 3	Outside Construction Site	Female	245		N	N			
BS96		165.892	31-Mar-11	641303	3928914	Outside Construction Site	Outside Construction Site	Female	213		N	N			
BS97		165.759	1-Apr-11	638320	3938582	Ivanpah 3	Ivanpah 3	Male	203		N	N			
BS98		163.151	1-Apr-11	637338	3938913	Fence line - Ivan 3	Ivanpah 3	Unknown	102		N	N			

Tort ID	Pen	Frequency	Transmitter Date	UTM Initial Easting	UTM Initial Northing	Initial Location	Current Location	Sex	MCL	Weight (g)	Health	Blood	ELISA Status M. agassizii	ELISA Status M. testudineum	Comments
BS99		163.734	2-Apr-11	637422	3938891	Ivanpah 3	Outside Construction Site	Unknown	157		N	N			